

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL SEARCH REPORT (PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 6013-140PCT	<b>FOR FURTHER ACTION</b>		see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/CA2004/001823	International filing date ( <i>day/month/year</i> ) 14 October 2004 (14-10-2004)	(Earliest) Priority date ( <i>day/month/year</i> ) 14 October 2003 (14-10-2003)	
Applicant UNIVERSITE LAVAL ET AL			
This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.			
This international search report consists of a total of <u>5</u> sheets.  <input checked="" type="checkbox"/> It is also accompanied by a copy of each prior art document cited in this report.			
<b>1. Basis of the report</b>  a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item. <input type="checkbox"/> the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).  b. <input type="checkbox"/> With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.			
2. <input checked="" type="checkbox"/> Certain claims were found unsearchable (See Box II).			
3. <input type="checkbox"/> Unity of invention is lacking (See Box III).			
4. With regard to the title. <input checked="" type="checkbox"/> the text is approved as submitted by the applicant. <input type="checkbox"/> the text has been established by this Authority to read as follows :			
5. With regard to the abstract. <input checked="" type="checkbox"/> the text is approved as submitted by the applicant. <input type="checkbox"/> the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.			
6. With regard to the drawings, a. The figure of the drawings to be published with the abstract is Figure No. <input type="checkbox"/> as suggested by the applicant. <input type="checkbox"/> As selected by this authority, because the applicant failed to suggest a figure. <input type="checkbox"/> As selected by this Authority, because this figure better characterizes the invention.  b. <input checked="" type="checkbox"/> None of the figures is to be published with the abstract.			

**INTERNATIONAL SEARCH REPORT**International application No.  
PCT/CA2004/001823**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons :

1. ☐ Claims Nos. :  
because they relate to subject matter not required to be searched by this Authority; namely:
2. ☒ Claims Nos.: 1, 2, 5, 6, 11, 13, 14 and 16  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically :  
  
see the extra sheet
3. ☐ Claims Nos. :  
because they are dependant claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box III Observation where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows :

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos. :
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos. :

**Remark on Protest**

- ☐ The additional search fees were accompanied by the applicant's protest.  
☐ No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/CA2004/001823

## A. CLASSIFICATION OF SUBJECT MATTER

IPC<sup>7</sup>: C07K-14/47, A01N-1/02, A61K-38/17, A61K-35/52

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC<sup>7</sup>: C07K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base, and, where practicable, search terms used)

Canadian Patent Database; Delphion; Esp@Net; CA Plus; PubMed

Key words: sperm, spermatozoa, chaperone, chaperonin, stress shock, heat shock, HSP60, GRP78, GroEL, Sec A, Sec B, Sec Y

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	ASQUITH et al. "Tyrosine phosphorylation activates surface chaperones facilitating sperm-zona recognition." Journal of Cell Science. July 15, 2004, vol. 117(6), pages 3645-3657	1, 2, 3, 7, 8, 11, 13-16
P,Y	whole document	4, 9, 10, 12
P, X	ASQUITH et al. "Localisation and significance of molecular chaperones; heat shock protein 1(Hspd1) and tumor rejection antigen gp96 (Tra1), in the male reproductive tract and during capacitation and acrosome reaction." BOR Papers in Press [online], September 29, 2004, Accession No. DOI 10.1095/biolreprod.104.032270.	1, 2, 3, 7, 8, 11 13-16
P,Y	whole document	4, 9, 10, 12
X	ECROYD et al. "Tyrosine phosphorylation of HSP-90 during mammalian sperm capacitation." Biology of Reproduction, December 2003, vol. 69, pages 1801-1807. (Published online before print July 30, 2003, Accession No. DOI 10.1095/biolreprod.103.017350)	1, 2, 7, 8, 11, 13-16
Y	whole document	3, 4, 9, 10, 12

Further documents are listed in the continuation of Box C.

Patent family members are listed in annex.

\* Special categories of cited documents :  
 "A" document defining the general state of the art which is not considered to be of particular relevance  
 "E" earlier application or patent but published on or after the international filing date  
 "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)  
 "O" document referring to an oral disclosure, use, exhibition or other means  
 "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  
 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone  
 "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art  
 "&" document member of the same patent family

Date of the actual completion of the international search  
12 January 2005 (12-01-2005)

Date of mailing of the international search report  
28 February 2005 (28-02-2005)

Name and mailing address of the ISA/CA  
 Commissioner of Patents  
 Canadian Patent Office - PCT  
 Ottawa/Gatineau K1A 0C9  
 Facsimile No. 1-819-953-9538

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 Colleen MacFarlane (819) 997-4614

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/CA2004/001823

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	HUANG et al. "The decline of porcine sperm motility by geldanamycin, a specific inhibitor of heat-shock protein 90 (HSP90)." Theriogenology, 2000, vol. 53, pages 1177-1184. whole document	1, 2, 7, 8, 11, 13-16
Y		3, 4, 9, 10, 12
X	HUANG et al. "Substantial decrease of heat-shock protein 90 precedes the decline of sperm motility during cooling of boar spermatozoa." Theriogenology, 1999, vol. 51, pages 1007-1016. whole document	1, 2, 7, 8, 11, 13-16
Y		3, 4, 9, 10, 12
X	IKAWA et al. "Calmegin is required for fertilin $\alpha/\beta$ heterodimerization and sperm fertility." Developmental Biology, 2001, vol. 240, pages 254-261. whole document	1, 2, 7, 8, 11, 13-16
Y		3, 4, 9, 10, 12
X	IKAWA et al. "The putative chaperone calmegin is required for sperm fertility." Nature, June 1997, vol. 387, pages 607-611. whole document	1, 2, 7, 8, 11, 13-16
Y		3, 4, 9, 10, 12
X	OKABE et al. "The putative chaperone calmegin and sperm fertility." from "The Male Gamete" in Basic Science to Clinical Applications, pages 47-54. Editor: Claude Gagnon. Publisher: Cache River Press, Vienna, Ill., 1999. whole document	1, 2, 7, 8, 11, 13-16
Y		3, 4, 9, 10, 12

## Continuation of Box No. II:

The expressions, "a polypeptide capable of binding a chaperone receptor" (Claims 1, 11, 13 and 16) and "a molecule capable of binding sperm cell chaperone" (Claim 2), are functional definitions and do not clearly define the chemical structures and thus are not in compliance with Article 6 (PCT). Similarly, the terms, "matrix protein" (Claims 2, 5 and 14) and "analogs or fragments thereof" (Claims 2 and 14), are not clearly defined in terms of their specific chemical structures, also contravening Article 6 (PCT). In addition, these expressions and terms are so broad as to encompass compounds not contemplated by the Applicant and do not find adequate support in the description and are thus not in compliance with Article 5 (PCT). Consequently, claims 1, 2, 5, 6, 11, 13, 14 and 16 have not been searched insofar as they relate to said terms and expressions. The claims have been searched on the basis of the preferred and adequately described polypeptides, namely, "chaperone polypeptide", "heat shock protein", "stress shock protein", "GRP78", "Sec A", "Sec B", "Sec Y" and "GroEL".